

## II

# QUANTITATIVE SERUM TESTS IN SYPHILIS

By T. E. OSMOND, Pathologist, V.D. Department,  
St. Thomas's Hospital.

NOWADAYS it is generally agreed that the treatment of *early* syphilis is a comparatively straightforward affair ; the vast majority of cases, provided they show no intolerance to arsenobenzol, pursue a steady course to apparent cure. This can usually be accomplished in about fourteen to eighteen months with thirty to forty injections of some arsenical remedy and a similar number of bismuth. Two or three years of observation with the usual negative blood tests and a negative spinal fluid examination and the case of early syphilis can be dismissed finally.

Not so with the late syphilitic. Whether he be a tertiary, congenital, or latent case, or one with central nervous system involvement, he has to be treated over a period of many years whilst, frequently, the management of his case taxes the ingenuity of the syphilologist to the utmost and the blood continues to show a positive Wassermann reaction irrespective of the form and amount of treatment given. It is most depressing both to doctor and patient to find that after each successive " course " of treatment the blood is still positive, more especially if, as in the latent case, there is no external evidence that the treatment is accomplishing anything. If it can be shown that the blood, though still positive, is gradually and progressively becoming less so, this will be a distinct encouragement to continue with therapeutic measures. Similarly, if we consider the tertiary case, the gumma probably heals in a few weeks, but the blood remains positive in spite of continuing with injections and potassium iodide. How long is treatment to be continued ?

It is in such cases as these that a quantitative blood test is of great value. A number of such tests has to be employed from time to time. A Wassermann reaction,

## QUANTITATIVE SERUM TESTS IN SYPHILIS

using increasing dilutions of patient's serum in saline, is apt to give a false impression, since the diminishing amount of serum present often affects the action of the antigen on the complement (this I have been able to demonstrate many times), with the result that the degree of positivity appears to be greater than it really is. A quantitative Kahn<sup>1</sup> reaction has been described, but the gaps are too wide to make it of much value. Vernes's test appeared to offer good results, but it has never been favoured in this country, and at the Serum Conference in Copenhagen, in 1928, did not appear so sensitive as is usually considered desirable.

There remains a reaction which was first elaborated by Dreyer and Ward called the "Sigma Test."<sup>2</sup> Briefly, the Sigma reaction consists in mixing varying dilutions of patient's inactivated serum with antigen and incubating for twenty to twenty-two hours. The antigen is a cholesterolised extract of calf's heart and is diluted with saline by dropping the latter on to the former at a given speed and from a given height. The reading of the results is carried out by noting the size of the flocculi and the dilution in which they occur and referring to a table provided which gives the results in numerals. This is a most valuable reaction, giving the results in units, and though somewhat laborious to perform has stood the test of time ; it would appear to be the test of choice for such cases as I have described. Though it occasionally fails altogether, it rarely if ever gives a false positive result. It is not the most satisfactory qualitative test—a large amount of serum is required ; the test is a laborious one to carry out and the result is not available in less than twenty hours, but as a quantitative test it appears to have no equal. A few selected cases will show its value at a glance.

*Case 1.*—Old latent syphilis of many years' standing. Sigma more than 54 units. Course of 10 injections of neoarsphenamine and bismuth. Sigma 22·2 units. After a second course lasting 3 months the Sigma had dropped to 8·3, and after a third course to 3·9 units. The patient exhibited no symptoms at any time. The Wassermann reaction was positive throughout.

*Case 2.*—Tertiary syphilis—gummatous ulcer of leg. Sigma units before treatment 48·9 ; the ulcer healed after 3 to 4 injections and by the end of the first course

## BRITISH JOURNAL OF VENEREAL DISEASES

of treatment the Sigma had fallen to 7.5. After the second, third and fourth courses the Sigma readings were 4.4, 3.6 and 3.4 respectively. After this the patient was kept under observation, and the Sigma readings, taken 3-monthly, varied between 4.4 and 1.9; the patient remained symptomless.

*Case 3.*—Latent syphilis. Sigma units 24 before treatment fell to 4.3 in 3 months and then read 4.1, 1.6, 2.8, and following that never exceeded 1.8. Finally, at the end of 7 years the figure fell to zero. It is needless to add that active treatment was not carried out throughout the whole of this period.

*Case 4.*—Congenital syphilis, discovered only by accident at the age of 22. Treated with 5 courses of arsenobenzol and bismuth. The Sigma reaction before treatment was 9.4 units. This rose to 15.1, fell to 6.9, rose again to 13.4 (at which time the spinal fluid was tested and found negative), then fell to 6.9 and finally to 3.7. Treatment was stopped, and the Sigma reading was 3.9 on three successive occasions at 6-monthly intervals following this.

Such cases are fairly typical and might be multiplied indefinitely; they represent the usual sequence of events, but cases do not always behave so well, as the following illustrates.

*Case 5.*—Case of secondary syphilis which relapsed, clinically and serologically, whilst under treatment. At this time the Sigma showed more than 61 units. Further treatment consisted of courses of sulfarsenol and bismuth with artificial pyrexia treatment after the fourth course. The following were the Sigma results at approximately 3-monthly intervals: 30.4, 15.1, 8.3, 13.4 (when the cerebro-spinal fluid was tested and found negative), 6.9, 3.9, 5.2 and 3.9. I do not suppose that any amount of treatment would render this patient's blood negative, but inasmuch as there have been no clinical signs for nearly 4 years and the C.S.F. is negative, there seems little likelihood that the patient will come to any harm provided he undergoes occasional courses of treatment and is kept under observation.

In my opinion, when the Sigma reaction has reached bed-rock, that is to say, when further active treatment has no effect in reducing the number of units in most cases, one may safely discontinue treatment and watch the patient, always provided that the C.S.F. shows no

## QUANTITATIVE SERUM TESTS IN SYPHILIS

pathological changes. A more general use of some quantitative reaction—such as the Sigma—would serve to show what effect treatment is having in a latent case, would help the syphilologist to decide when to suspend active treatment in old-standing cases and frequently encourage the patient to persevere with a treatment which may often seem both irksome and inefficacious. The Sigma reaction has been in constant use in this clinic for more than twelve years—and has proved of great value in such cases as have been described. It need hardly be added that it is a series of Sigma reactions—not a single one—which is so useful in evaluating the condition of the patient and the effect of treatment.

I have to thank Col. L. W. Harrison, Director of the Clinic, for permission to publish this paper.

### REFERENCES

- (1) The Kahn Test. "A Practical Guide," R. L. Kahn, 1928. Baillière, Tindall and Cox, 1928, p. 132.
- (2) *Lancet*, 1921, *i.*, 956.